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ABSTRACT

Resarch about office computerization and its relationships to gender and level in the organization is fairly new. Despite increased use of computers in offices and the belief that employee attitudes toward the technology may be crucial when trying to achieve technological effectiveness, few studies have examined these issues. A study was conducted to investigate how an individual's perception of career success might be related to his/her attitude toward a computer-based technology. Twenty-eight Canadian employers from large firms, medium-sized firms, educational institutions, and government agencies selected three to six successful managers and an equal number of support personnel from various departments. Employees (N=196) who used computers at work were selected and administered an anonymous questionnaire to assess their present positions in terms of success and their perception of the technology available to them. The results confirmed the hypothesis that computer attitudes would explain employee perceptions of job and life success. The results also demonstrated that employees assessed computers differently depending on whether they used intelligent workstations or main-frame terminals. Respondents felt that the effect of intelligent workstations upon communication was positive. Other data showed that the perceived effect of computers upon control differed strongly according to gender. Women reported feeling less in control when working with a main-frame terminal than did men, while the perceptions of control when working with an intelligent workstation were about equal for men and women. These findings suggest implications for both researchers and practitioners. (NB)

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AN ASSESSMENT OF COMPUTER ATTITUDES AND THEIR EFFECT ON CAREER SUCCESS[1]

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AN ASSESSMENT OF COMPUTER ATTITUDES AND THEIR EFFECT ON CAREER SUCCESS

Abstract

Research about office computerization, and its relationships with gender and level in the organization is fairly new. Despite increased use of computers in offices and the belief that employee attitudes toward the technology may be crucial when trying to achieve technological effectiveness, few studies have examined these issues. Based on earlier findings, this study predicted that computer attitudes would explain employee perceptions of job and life success. The results confirmed this hypothesis. Furthermore, our study assessed computer attitudes as they relate to gender, hierarchical level and type of computer used. Respondents varied according to category of computer used most often (intelligent workstation vs. main-frame terminal). They felt that the effect of intelligent workstations upon communication is positive. The data also showed that the perceived effect of computers upon control differs strongly according to gender. The implications of this project for researchers as well as practitioners are discussed.

AN ASSESSMENT OF COMPUTER ATTITUDES AND THEIR EFFECT ON CAREER SUCCESS

It is expected that by the end of this decade, the majority of clerical as well as managerial workers will use computers in their daily work (Giuliano, 1982; Gutek, 1983). The impact of computerization upon job design and work structure has already been substantial, and it has become an area of considerable interest for human resource management. However, most of the relevant research has dealt with areas such as human factors engineering, financing and organizational designing (e.g., Lieberman, Selig & Walsh, 1982, chap. 1 & 2). Policy and strategy issues as related to computer technology have taken most of the limelight in organizational literature (Megaw & Lloyd, 1984), while human resource aspects have largely been ignored by organizational researchers, even though additional work in this area is deemed necessary (Kahn, 1981).

This paper investigates how an individual's perception of career success might be related to his/her attitude toward a computer-based technology. Specifically, this study looks at a construct of subjective career success with such dimensions as job and financial success. These are coupled with computer attitudes assessing worker views about quality of job life and communication. We intend to find out if employees differ in their evaluation of computer-based technology due to the type of equipment used, hierarchical level in the organization and the individual's sex. Some researchers have pointed out that studies applying scales in cultural settings, other than the ones for which they were originally developed, are scarce. This is the case even though internationalization of business makes such research ever more valuable to management (Adler, 1983). Consequently, this study will also examine if two expanded scales, developed in the U.S., can be used successfully in Canada to explain differences related to subjective career success and computer attitudes.

Research to date has assessed career success as perceived by persons evaluating others careers, generally with such criteria as job title, salary and promotions (e.g., Gould & Penley, 1984; Kotter, 1982; Stumpf & Rabinowitz, 1981). Organizational researchers have claimed that only by increasing our knowledge about internal success perceptions will the best job-person fit be possible (Brousseau, 1983; Driver, 1979; Schein, 1978), yet researchers and human resource specialists usually know little or nothing about an individual's own concept of career success (cf. Schein, 1978).

The introduction of computer-based office information technology into an existing office environment has usually been technology-led, without consideration of potentially negative effects upon the workforce and the quality of job life (Gattiker, 1984). The following literature review points out the human resource aspects of prior research in this area. Conceptual papers appear to outnumber applied studies, and most applied research to date has concentrated on computer technology from the organizational perspective (Megaw & Lloyd, 1984). Studies investigating the effects of gender, hierarchical level and type of technology on an individual's evaluation of the computer and career success are lacking but needed (e.g., Kling, 1978; Panko, 1984).

Literature Review

Computerization and the Transformation of the Workplace

Apart from its impact upon the skill base of a company's workers, computer technology is expected to alter fundamentally the conditions of employment in organizations. Potential problems with computerization have already been noted in field studies and specified in the literature (e.g., Kling, 1978). As a consequence of such automation, many tasks could become more routine and repetitive and less challenging (Shepard, 1971, chap. 4). It is in the interest of both the organization and its employees to inter-

pret the ever increasing use of office technology as improving the quality of work life (Kahn, 1981). In a recent study, Gattiker, Gutek and Berger (1985) concluded that personal computers were indeed perceived as being most helpful in improving work effectiveness and the quality of work life.

Other relevant concerns are performance and control as perceived by employees (Salzman & Mirvis, 1985). Although computers may take credit for improving efficiency and effectiveness on the job, they can also provide new avenues of control for management which could lead to worker hostility and unrest (Mankin, Bikson & Gutek, 1982). However, very little empirical research has been done in this area (e.g., Kling & Iacono, 1984).

Still another related factor is communication. Some technologies are more useful for this purpose than others, but the computer appears to have become an important new tool capable of improving communications. Yet, research has shown that people communicating via computers evaluated each other less favorably than did people dealing face-to-face (Kiesler, Zubrow, Moses & Geller, 1985). This result is of crucial significance since a major part of office work involves the exchange of large amounts of data and information (Doswell, 1983; Panko, 1984).

Attitudes toward computer-based technology. Most new technologies are adapted in hopes of facilitating higher productivity and job satisfaction (Bodmer, 1982; Gutek, 1983). However, the relative neglect of user attitudes in the study of office information technology could be detrimental to these goals. Objective factors (the technology in a person's work environment) affect subjective factors (perception of work), which, in turn, influence individual responses (productivity and absenteeism) (see Kahn, 1981; Katz & Kahn, 1978, pp.577-609).

Organizations need to stay on top of the latest technological developments to remain competitive. At the same time, they ought to make sure that employees adapt to the altered working conditions created by the introduc-

tion of new technology. Employees should feel comfortable with the technology and perceive it as being helpful in their work (Gutek, 1983). It appears sensible, therefore, to expand the concept of organizational and individual fit by including technological constraints as well. As a result, human resource specialists and organizational researchers should consider individual, organizational and technological needs when trying to obtain a good match between a position and a potential employee (Gattiker, 1984).

Computerization and Career Success

Organizational research conducted to date has concentrated on success from the external career perspective. Numerous popular books suggest career strategies, specify education and the "proper" entry position so that hierarchical progression and a successful career are assured (cf. Blank, 1981; Lynch, 1978; Molloy, 1977). Very few studies deal with subjective career success as manifested in the worker's own evaluation of his/her career progress and satisfaction (e.g., Korman, 1980; Larwood & Gattiker, in press).

One recent study (Gattiker, 1985) developed a scale for perception of career success using white-collar workers in metropolitan areas of the U.S. Four facets of career success were measured: job, life, financial and interpersonal success. Computerization has seldom changed an employee's level of remuneration nor his/her relationships with peers and management (Gutek, 1983; Pava, 1983). Therefore, a person's perception of financial and interpersonal career success may not necessarily relate to his/her feelings about a technology (cf. Gattiker, 1984). However, since computerization affects skill levels, as well as the structure of work, it would be interesting to see if job and life success are related to an individual's assessment of computer technology (Salzman, 1985; Salzman & Mirvis, 1985). Unfortunately, applied tests of these dimensions are virtually non-existent.

Responses According to Computer Technology and Demographics

Computer technology. Do shared myths based on media hype influence computer attitudes and perceptions (Dierkes & Von Thienen, 1984; Pava, 1983)? Some researchers have argued that different types of computer-based technology affect people's work differently (e.g., Salzman & Mirvis, 1985). For instance, employees working with a main-frame computer may perceive greater control when compared to users of personal computers or word processors (cf. Kling & Iacono, 1984). In contrast, some employees may feel their work is being deskilled and may fear losing their job within the organization. These negative attitudes and perceptions toward computers may be exacerbated by shared myths based on media hype (Dierkes & Von Thienen, 1984; Pava, 1983).

Much attention has been focused on intelligent workstations and their effectiveness in facilitating communication both within and without the organization (Demby, 1985). Spreadsheet and word-processing programs allow preparation of highly presentable reports, often including graphics and figures. These and other new capabilities can improve communication through more effective use of the medium at either end (Pava,1983). Yet, applied organizational research studying computers and communication is limited, and most existing research has not compared responses from individuals working with main-frame terminals as opposed to intelligent workstations (Kiesler, Zubrow, Moses & Geller, 1985).

Demographics. Various research data showed that often women are more affected by computerization than men due to their occupations and positions, but these studies have not examined specifically if women evaluate the technology itself differently from their male peers (Form & McMillen, 1983; Gutek, 1983). Therefore, a need exists for a more complex research design making use of multivariate statistics to extract such differences in attitudes (Kling, 1978).

People appear to seek jobs offering a structure compatible with their

aptitudes and skills (Kohn, Schooler, Miller, Miller, Schoenbach & Schoenberg, 1983; Spenner, 1983). Individual assessments of computers at work might not necessarily differ along hierarchical lines, but this does not mean that computerization affects managers and support personnel similarly. Instead, a self-selection process may have eliminated objective differences (Gattiker, 1985; Spenner, 1983). These dimensions should also be examined in greater detail.

Summary

A multiplicity of factors influence an individual's perception of career success. Efforts to create work systems capable of sustaining good job-person matches must deal with developmental issues such as technological innovations (e.g., Brousseau, 1983). Several important aspects have been identified pertaining to quality of work life, including a person's assessment of subjective career success and computer attitudes as well as type of computer-based technology, hierarchical level and gender (Podgorecki, 1981). However, organizational researchers have not embraced computerization and quality of work life, nor have they made a significant attempt to study the relationships between technology, career success and demographics (cf. Kahn, 1981; Podgorecki, 1981).

Research Issues

The present study examined subjective career success with the following four predictors: attitudes toward computer-based technology as they measure quality of job life, work effectiveness, communication and control. The expectations to be tested here are that positive correlations exist between a person's computer attitudes and job and life success. Furthermore, this study will test if the type of computer used can result in varying employee attitudes towards the technology, and we will examine how gender and hierarchical level in the organization could affect those attitudes. Various researchers have mentioned these factors as potentially important;

therefore, several analyses will be conducted to investigate these issues (e.g., Form & MacMillen, 1983; Salzman & Mirvis, 1985). Additionally, a scale developed in the U.S. to measure subjective career success (Gattiker, 1985) and an expanded version of a measure to assess computer attitudes (Gattiker, Gutek & Berger, 1985) will be used to evaluate their applicability in a Canadian setting.

The following hypotheses were established:

Hypothesis 1. In agreement with the literature previously cited, quality of job life, work effectiveness, communication and control will explain a significant part of the population variance and correlate positively with job success and life success. It was specifically predicted that:

H1a. Perceived quality of job life as well as work effectiveness will explain the largest part of the population variance in job success and life success of any predictor set used in this study.

H1b. All predictor variables together will explain a significant part of the population variance in job success and life success.

Judging by previous organizational research, the usefulness of computer attitudes for explaining a person's perceived financial and interpersonal career success was open to question (cf. Gattiker, 1984; Spenner, 1983).

Hypothesis 2. In accordance with the literature cited earlier, communication and control effects will be perceived differently by users of non-intelligent versus intelligent workstations. These two groups might also differ according to gender. Specifically, the following three predictions were made:

H2a. A respondent's evaluation of computers will differ based on the type most used in his/her work.

H2b. Communication possibilities are better with an intelligent workstation when compared to a mainframe terminal, according to user

perceptions.

H2c. Computer evaluations will differ according to the respondent's gender.

Most of the items used here to measure computer attitudes are taken from a study by Gattiker, Gutek and Berger (1985), but there are significant differences in how the samples were collected. In this project, small and large companies established in urban areas of Canada participated, while the previous study used only large companies located in two metropolitan areas of the U.S.

Method

Design and Subjects

A stratified sample of twenty-eight employers was asked to participate in a survey of personnel "computer attitudes and perception of career success." The employers represented these groups: 10 were firms selected at random from the Globe and Mail annual roster of Canada's largest organizations; 12 companies were medium-sized firms from Western Canada; the final six comprised three educational institutions and three government agencies. Except for the stipulation of their locale (Western Canada), organizations were recruited randomly within each classification.

Organizational type was not a variable of interest here. The educational and government institutions were included because they brought potentially different organizational cultures and constructs of effectiveness to the sample, thus allowing more reliable generalizations from the findings (cf. Blalock, 1984, chap. 4).

All employers were asked to select three to six successful managers (female and male) and an equal number of support personnel from a variety of departments, and to distribute a questionnaire to these individuals. In order to avoid influencing selection decisions, organizations themselves determined what they considered to be "successful." Surveys were returned

directly to the researchers.

Of the 380 people asked to participate in the study, 340 agreed and 306 responses were ultimately received (90%). Respondents included both sexes (about 66% were female) and approximately 65% were married. 196 (64%) of 306 participants were computer users, while the remaining 110 indicated other primary technologies such as the telephone or typewriter. The analyses performed for this study are based on the sample of 196 computer users.

Instrument

Respondents completed an anonymous questionnaire to assess their present position in terms of success, and, also, their perception of the technology available to them. The survey instrument was divided into three segments, with the first eliciting information about subjective success. Questions concerned global success, salary and income as compared to peers within one's own company and beyond. Sample statements are: "I am respected by my peers" to: "I am earning enough to pay my bills," with each rated on a five-point scale, ranging from (1) "agree completely" to (5) "disagree completely." 25 of the 38 items had been developed recently (Gattiker, 1985) while the remainder were added for this new study.

The second part was related to one's feelings toward computer-based technology, specifically, how it supports individuals at work, whether they like using their computers, and if such use makes them more effective. The same five-point scale was provided. Of 27 items, 16 had already been developed by Gattiker, Gutek and Berger (1985) while 11 more were newly added. Additional questions about one's type of technology and the percentage of time spent using it were also included. The final section of the questionnaire concerned demographics, asking about annual income, educational background, job title and the like.

Career Success and Computer Attitudes

Dependent variables. The dependent variables for career success were obtained by means of a factor analysis of the 38 success items described previously. To decide the number of factors for orthogonal varimax rotation and interpretation, eigenvalues (>1.0) were considered (Kaiser, 1974). Item scale loadings greater than .30 were statistically significant ($p<.001$), according to the Burt-Banks criterion (Child, 1970). This conservative approach was used to avoid reporting results based on sample characteristics which could not be replicated in the future (cf. Webb, Campbell, Schwartz, Sechrest & Grove, 1981, chap. 3). The statistically significant items were then checked for their item-item and item-total correlation within each factor. Only items which correlated positively with other items in the same factor were retained for the scales discussed below (Nunnally, 1978, chap. 3 & 6). These scales were then used as the criterion variables in multiple regression analyses.

Predictor set. The independent predictor sets were the items measuring computer attitudes. Identical procedures as previously described were used to find the independent variables. Scales were constructed in the same way as before. The predictor scales were taken as independent variables in multiple regression analyses to determine the amount of population variance explained in career success.

Multiple regression is best suited when trying to determine the magnitude of a phenomenon (Cohen & Cohen, 1983, chap.1). For correct application, multiple regression assumes that the residuals are normally distributed (bivariate and multivariate normal distribution). To test this assumption, the data used in each of the regression runs were tested for data outliers by first looking at standardized residuals, and second, by evaluating a histogram of the standardized residual plots. The analyses of these two procedures, and, also, the normal probability plots of the standardized residuals obtained, showed that the data collected met the

normal distribution assumption.

Demographics and Computer Attitudes

Dependent variables. These variables were the four factors extracted from the 27 items measuring computer attitudes. Scores on the factors were used in multivariate and univariate analyses of variance to determine any differences in employee attitudes toward their computer-based technology.

Independent variables. The variables sex and hierarchical level in the organization (manager or support personnel) were used to determine if they would help to distinguish between respondents' computer attitudes. The type of computer used (intelligent workstation versus main-frame terminal) was also included in these analyses. Univariate and multivariate analyses of variance were done to test for possible differences.

Results

Factors in Career Success and Computer Attitudes

To obtain the independent factors, orthogonal varimax rotations and reliability analyses were done with the 38 items measuring career success. Loadings greater than .30 were statistically significant ($p<.001$, according to the Burt-Banks criterion). All 38 items loaded highly enough and were retained to define four factors which are labelled as follows: (1) career success, (2) life success, (3) financial success, and (4) interpersonal success. The same analyses were performed with the 27 items measuring computer attitudes, which also loaded highly enough and were retained to define the following four factors: (1) quality of job life, (2) work effectiveness, (3) communication, and (4) control. Except for control, the reliability coefficients for perception of career success and computer attitudes are well above .70 which has been suggested as a desirable minimum for constructs in the early stages of formulation (Nunnally, 1978, p. 245) (cf. Tables 1 and 2). Therefore, the expanded scales developed by Gattiker (1985) for career success, as well as the extended version of a computer

attitude measure developed for the U.S. (Gattiker, Gutek & Berger, 1985), can be applied in Canada, achieving desirable levels of reliability.

Insert Tables 1 & 2 about here

Predicting Career Success

Hypothesis 1a. This hypothesis stated that the perceived influence of the technology upon quality of job life and work effectiveness would predict the largest part of the population variance in job success and life success. To obtain the unique adjusted R^2, the composite measuring quality of job life was entered by itself. Work effectiveness, communication and control were also subjected to separate regression runs.

The quality of job life measure accounted for a significant amount of the population variance (10%) when predicting an individual's perception of job success (see Table 3). Within this factor, we examined Pearson's r to determine the direction of the factor contribution, as suggested by Cohen and Cohen (1983, chap. 3). Quality of job life correlated positively ($p<.001$, by a two-tail test of Pearson's r) with job success. This may mean that respondents who enjoy their work feel that they have job success.

Insert Table 3 about here

Work effectiveness also accounted for a significant part of the population variance in job success (8%), showing a positive correlation ($p<.001$, by a two-tail test of Pearson's r). One interpretation could be that a respondent who perceives the computer as aiding his/her work effectiveness tends to feel successful on the job.

Communication explained only 4% of the population variance in job success. The two composites correlated positively ($p<.01$, by a two-tail test of Pearson's r), indicating that the workers who think the technology helps them to communicate better within and beyond the organization also perceive job success.

Quality of job life accounted for 5% of the population variance when predicting an individual's perception of life success. These two composites correlated positively ($p<.001$, by a two-tail test of Pearson's r), meaning that those individuals who enjoy their work also feel successful in life.

Work effectiveness accounted for 7% of the population variance when predicting life success. Again, these two composites correlated positively ($p<.001$, by a two-tail test of Pearson's r), showing that a respondent who perceives the computer as aiding his/her work effectiveness also believes to have life success.

Control accounted for only 3% of the population variance when predicting an individual's perception of life success. The correlation with life success was negative ($p<.01$, by a two-tail test of Pearson's r), suggesting that those employees who feel computer technology controls their behaviour at work do not perceive having life success. Based on these results, Hypothesis 1a seems confirmed.

Hypothesis 1b. This hypothesis stated that all predictor variables together would explain a significant part of the population variance in job and life success. The results show, however, that quality of job life and communication by themselves already account for nearly the same amount of the population variance explained in prediction of job success as do all predictors combined (cumulative adjusted R^2 = .13) (cf. Table 3). The cumulative R^2 also indicates a net suppression, which is explained by the fact that all scales are positively correlated (Cohen & Cohen, 1977 pp. 87-92).

Table 3 further demonstrates that quality of job life and work effectiveness by themselves account for nearly the same amount of the population variance explained in the prediction of life success as do all four factors combined (cumulative adjusted R^2 = .12). Again, this can be explained by the fact that all r's are positively correlated, leading to a

net suppression (Cohen & Cohen, 1977, pp. 87-92). Overall, the results as listed in Table 3 support Hypothesis 1b.

Computer Technology in the Office

Two types of computer-based technology were examined in these analyses, main-frame terminals and intelligent workstations (personal computer and word processor). Survey respondents were grouped according to the type of computer used most often. Individual evaluations of computer-based technology were also examined according to gender and hierarchical level (managers vs. support personnel). Multivariate analysis of variance and univariate analysis of variance were used to compare the scores of each of the groups on the four factors.

Hypothesis 2a. This hypothesis stated that respondents would differ in their evaluation of a technology depending upon their use of a main-frame terminal or an intelligent workstation. The results of these two analyses for each type of computer are shown in Table 4.

Insert Table 4 about here

The multivariate test (F tests of Pillai's V from SPSSX MANOVA) showed reliable ($F=2.62$, $p<.05$) differences between the technology groups on the pattern of their scores on the four factors. This result supports Hypothesis 2a.

Hypothesis 2b. It was claimed that computer users (main-frame terminal versus intelligent workstation) would differ in their evaluation of the computer's influence upon communication within and beyond the organization. Univariate tests using scores on the individual factors revealed group differences for communication (cf. Table 4, fourth row -- "C with effects of M & S removed"). This could mean that the factor communication distinguishes among individuals as to the type of workstation used. The means derived from the scales indicate that individuals working with intelligent workstations felt that communication improved significantly when

compared to main-frame terminal users ($p < .01$, by a two-tail t-test between the scale means of the two groups). Based on the above, Hypothesis 2b seems confirmed.

Hypothesis 2c. Hypothesis 2c suggested that individual evaluations of computer-based technology would differ according to gender. As Table 4 demonstrates (cf. last row -- "S with effects of C & M removed"), the multivariate test result (F test of Pillai's V = 3.51) shows a highly reliable ($p<.01$) difference between the men and women in the pattern of their scores on the four factors. The univariate tests using scores on the individual factors revealed group differences in both analyses for communication and control (means will be reported below). However, there were no reliable differences between a person's gender and his/her perceived quality of job life and work effectiveness. These results confirm Hypothesis 2c.

Type of computer and gender of respondent. If a person's sex and the type of computer he/she uses are analyzed simultaneously with a multivariate test of Pillai's V (F = 2.51), the respondents differ reliably ($p<.05$) in how they evaluate their computers (cf. Table 4). The univariate tests show that the respondents differ in their evaluation of the factors communication and control.

The means derived from the scales indicate that women perceived increased control when working with a main-frame terminal ($p<.01$, by a two-tail t-test between the scale means of the two groups). However, female respondents did not differ statistically significantly from male respondents in their perception of control when judging intelligent workstations.

The means also show that female respondents differ in their evaluation of computer-aided communication. Women perceived less improvement in communication possibilities from intelligent workstations than men did ($p<.01$, by a two-tail t-test of the two scale means). However, female

respondents did not significantly differ from their male peers when assessing communication with main-frame terminals.

Type of computer and hierarchical level. Table 4 also illustrates that one's position in an organizational hierarchy does not really help to differentiate between respondents. In other words, individuals participating in this survey did not differ along hierarchical lines (manager versus support-personnel) in their evaluation of computer-based technology.

Discussion

The primary purpose of this study was to examine perceptions of career success and computer attitudes. The latter are likely to affect the user's quality of work life, productivity and absenteeism (Kahn, 1981). Furthermore, employee attitudes toward computers, together with their perceptions of career success, have been identified as crucial dimensions when determining the effective use of computer technology in organizations (e.g., Carter, 1984; Pava, 1983).

Career success and computer attitudes. The present data reveal that at least two dimensions (i.e., quality of job life and work effectiveness) can be isolated. These predict a significant part of the population variance in worker perception of both job and life success. Brousseau (1983) suggested that a more ideal job-person fit will be achieved if an individual views technology favorably because such an attitude will influence his/her evaluation of career success positively. The results of this research project support Brousseau's suggestion. It would appear, then, that if technological developments at work are agreeable, the person's perception of career success increases (Podgorecki,1981).

Another significant predictor of job success is communication via computer which explains a significant part of the population variance in life success. A most intriguing result is the fact that financial and interpersonal success could not be explained by the predictors, except for a

positive correlation between work effectiveness and interpersonal success. This strongly supports other conceptual research contending that computerization generally does not change remuneration levels nor the patterns of interaction with peers and superiors (Salzman & Mirvis, 1985).

As the cumulative adjusted $\underline{R}^2$ shows, neither perceived ease of communication nor control by computers add significantly to the variance accounted for by work effectiveness and quality of job life. This result now stands opposite a claim by other researchers that communications, and, also, control exerted over employees, will be changed by computerization (e.g., Zuboff, 1982). Our data does not necessarily contradict such earlier work; however, they point out objective changes in these areas. Nevertheless, they may not ever have materialized in the individual's subjective assessment. Since more than 80% of the computer users in this sample had worked with the technology for more than three years at the time of the survey, differences due to the novelty of computers probably had been eliminated.

Computer technology. The present results show that people assess computers differently depending on whether they use intelligent workstations or main-frame terminals. In contrast to other work (e.g., Gattiker, Gutek & Berger, 1985), respondents did not differ in their evaluation of quality of job life. Instead, users varied in how they assessed communication and control. Particularly, males more than females felt that intelligent workstations improved their communications within and without the organization. They did not differ in how they assessed communication using a main-frame terminal. Moreover, women felt less in control when working with a main-frame terminal, while the perceptions of control working with an intelligent workstation were about equal for men and women. This is even more interesting when considering that a random stratified sample was used including both women and men from similar hierarchical levels.

Some researchers have concluded from their data that women are more affected by, and respond differently to, computerization because of the jobs and occupations they hold (Form & McMillen, 1982). However, the differences reported here might just simply indicate a gender difference in work outlook and attitudes toward computers (Morgall, 1983). Computerization also might affect managers and support personnel differently since their responsibilities vary a great deal (Gattiker, Gutek, & Berger, 1985). There are longitudinal studies about jobs, job design and skills which show that a self-selection process seems at work (e.g., Spenner, 1983). People choose occupations and jobs which fit their individual needs in such areas as job complexity and decision-making (Schein, 1978, chap. 8). For instance, programming at a terminal may appear preferable to endless hours of data entry to an outsider (cf. Gutek, 1983; Mankin, Bikson, & Gutek, 1982), yet the incumbents of such positions probably would not want to trade places. In other words, objective differences may not transcend the individual subjective assessments of career success and computers.

Implications for Management and Future Research

This study presents strong evidence for placing research on computer-based technology within a larger context than before. A thorough understanding of the effective use of any computer-based office technology is substantially reduced if the subjective aspects of employee attitudes toward such technology are ignored (Blackler & Brown, 1985). Moreover, the organization must consider the technology's influence on individual perceptions of career success if an improved job-person fit is to be achieved. Future research should continue to explore this issue. In particular, the possible impact of organizational commitment, stress and anticipated turnover because of computer attitudes should be investigated.

One of the open questions in organizational research concerns factors

measuring computer attitudes which distinguish various kinds of users (main-frame terminal versus intelligent workstation) (Blackler & Brown, 1985). Respondents in this study felt that intelligent workstations tend to improve communication within and without the organization, providing a partial answer.

For managers, the results obtained present new confirmation that computerization of work does affect certain aspects of an employee's perception of career success. However, these effects are relatively small and insignificant for financial and interpersonal success. Some researchers have suggested that other dimensions of subjective assessment of work-related aspects such as job features might be of considerable importance also (Gattiker & Larwood, in press). The most important result for managers seems to be the difference between users of intelligent workstations and mainframe terminals.

The results, together with other studies (e.g., Gattiker, Gutek & Berger, 1985), suggest that productivity increases with computerization might be best achieved by providing employees with intelligent workstations with mainframe communication abilities. Since the respondents felt most comfortable with intelligent workstations, it is safe to assume that their productivity levels will ultimately be higher than if they worked with mainframe terminals only (Carter, 1984; Kahn, 1981). Females' less positive attitudes reported in this study might result from fears and less acceptance of computers than their male colleagues. One possible strategy to overcome this problem might be additional education and information for female workers about computers and their effect on their work as suggested by some researchers (cf. Dierkes & Von Thienen, 1984).

The implications of these results are highly complex. An attempt has been made here to expand the research on computer-based technology by studying user attitudes. Furthermore, the relationship between computer

attitudes and perception of career success shows that job and life success are highly correlated with the individual's evaluation of computer impact upon work effectiveness and quality of job life. Additionally, gender differences among computer users have been shown and tested. Before our results can be fully accepted, however, further research is necessary. For example, all constructs should be expanded with additional items. The scales need to be tested again with a U.S. sample from similar organizations before their viability for broad cross-cultural applications can be considered confirmed. It is imperative for management and human resource specialists to know a job candidate's prevailing beliefs about computers and their relationship to subjective career success so that optimum placement within the organization will be facilitated. The findings of this research project should be of help to managers in achieving this goal.

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Table 1

Items used to Define Four Factors: Perception of Career Success

Factor	Items	Factor Loadings	Variance Explained per Factor	Item-Total Correlation	Cronbach's Alpha
	I am				
1	receiving positive feedback about my performance from all qtrs	.46		.50	
Job	offered opportunities for further education by my employer	.50		.46	
Success	pleased with the promotions I have received so far	.66		.63	
	having enough responsibility on my job	.64		.45	
	in a job which offers promotional opportunities	.58		.52	
	reaching my career goals within the time frame I set	.64		.62	
	fully backed by management in my work	.61		.58	
	going to reach all my career goals	.43		.48	
	in a job which offers me a chance to learn new skills	.74		.60	
	most happy when I am at work	.46		.40	
	offered challenges at my work	.73		.61	
	having my superior's confidence	.53		.54	
	in a position to do mostly work which I really like	.65		.54	
	in a position to set my own goals	.60		.62	
	enjoying the challenging goals I have on my current job	.73		.66	
	praised often by my superior(s)	.55		.55	
	dedicated to my work	.53		.41	
	offered opportunities for promotion by my employer	.62	26.4	.61	.90
2	respected by my peers	.51		.52	
Life	happy with my private life	.71		.62	
Success	accepted by my peers	.65		.61	
	enjoying my non-work activities	.73		.65	
	satisfied with my life overall	.65		.63	
	having the confidence of my peers	.61		.58	
	enjoying spending my spare time with friends	.48		.39	
	enjoying a happy family life (spouse/partner, children,etc.)	.64	8.2	.56	.84
3	receiving fair compensation compared to my peers	.60		.56	
Financial	drawing a high income compared to my peers	.50		.35	
Success	earning as much as I think my work is worth	.77		.68	
	earning enough to pay my bills	.61		.50	
	obtaining a salary which supports my current lifestyle	.72		.62	
	paid well when compared to similar jobs in other companies	.74	6.1	.64	.80
4	getting positive performance feedback from my peers	.59		.50	
Inter-	setting my own timeframe for career goals	.40		.43	
personal	often doing something with my peers outside of work	.55		.34	
Success	often asked for advice on private matters by my peers	.66		.50	
	frequently getting feedback from my peers about my performance	.65		.52	
	consulted often to advise a colleague on a job matter	.58	5.0	.46	.72
Total Variance explained			45.6		

Note. The above factors were obtained using principal components analysis. Orthogonal varimax rotations were performed on the data. Only loadings greater than .30 were statistically significant ($p < .001$) according to the Burt-Banks criterion (Child, 1970).

Table 2
Items Used to Define Four Factors: Technology Attitudes

Factor	Items	Factor Loadings	Variance Explained per Factor	Canada Item-Total Correlation	Cronbach's Alpha
1	This equipment is fun to use	.79		.71	
Quality	Using this piece of equipment makes my work more interesting	.84		.76	
of	I enjoy using this piece of equipment	.84		.81	
Job Life	This piece of equipment enables me to do interesting tasks at work	.72		.55	
	The use of this piece of equipment makes my work more enjoyable	.82		.82	
	I like doing my work with the help of this equipment	.76		.78	
	My work wouldn't be as much fun if I could not use the equipment	.64	25.1	.61	.90
2	At my work I depend a great deal on this equipment	.47		.38	
Work	This piece of equipment enables me to do my job more effectively	.69		.68	
Effectiveness	This piece of equipment makes my work easier	.66		.63	
	This piece of equipment supports me in my work	.56		.53	
	I am more effect. in work with this equip. than I would be with out it	.68		.65	
	Using this equipment makes me more productive	.73		.72	
	This piece of equip. enables me to do my work faster	.74		.70	
	This piece of equip. enables me to do my job more thoroughly	.63	12.4	.70	.87
3	This piece of equip. facilitates communication among people in org.	.77		.56	
Communication	This piece of equip. facilitates communication with people out of org.	.74		.55	
	This piece of equip. allows me to transmit info. to somebody else	.68		.52	
	I prefer a face-to-face meet. over using this equip. for important mat	.34		.15	
	The use of this equip. has improved communication beyond the organization. (compared to previous methods)	.74	7.9	.58	.71
4	I feel this piece of equip. controls my behavior at work	.60		.40	
Control	This piece of equip. makes my work more demanding	.50		.29	
	My productivity is controlled by this equipment	.63		.41	
	Using this equip. limits my ability to move around	.54		.31	
	Generally, I prefer to communicate with equip. rather than face-to-face	.48		.31	
	If equip. is out of order, I cannot do my work	.53		.28	
	It is important to me that this equip. be in use throughout the day	.53	6.8	.30	.61
Total Variance Explained			52.2		

Note. The above factors were obtained using principal components analysis. Orthogonal varimax rotations were performed on the data. Only loadings greater than .30 were statistically significant ($p < .001$) according to the Burt-Banks criterion (Child, 1970).

Table 3

Perception of Career Success: R^2 by Each Predictor Set

Predictor Set	Number of Variables	Job Success	Life Success	Financial Success	Inter-personal Success
Quality of Job Life	1	.10****	.05****	.01	.02
Work Effectiveness	1	.08****	.07****	.01	.02*
Communication	1	.04***	.00	.00	.01*
Control	1	.00	.03***	.00	.00
Cumulative Adjusted R^2		.13***	.12****	.00	.04

Note. Adjusted R^2 is an estimate of the population R^2 adjusted for the number of predictors (Cohen & Cohen, 1983, pp. 105-107) with the multiple regression values actually obtained. The unique contribution of the adjusted R^2 of work enjoyment, work effectiveness, communication and control was obtained with separate regression runs. To obtain the cumulative adjusted R^2, all predictor variables were entered together in the regression at the same step/time. Job success, life success, financial success and inter-personal success represent the factors obtained.

***p< .001
****p< .0001

Table 4

Multivariate Analysis of Variance for Attitudes Towards Computer

Source	df	Multivariate Tests of Pillai's V: F	(df)	Univariate F-tests: Quality of Job Life	Work Effectiveness	Communication	Control
C (type of Computer)	1	3.12*	(4,172)	4.60*	.55	4.40*	4.26*
C with effects of M removed		2.51*		3.40	.19	3.73*	3.61*
C with effect of S removed		2.95*		3.29	.36	6.87*	1.20
C with effects of M & S removed		2.62*		2.85	.20	6.15*	1.23
M (Hierarchical Level)	1	1.31	(4,172)	2.36	1.98	.92	.89
M with effects of C & S removed		1.00		.94	1.56	1.18	.03
S (Sex)	1	3.37**	(4,172)	1.58	.27	.94	8.14**
S with effects of C & M removed		3.51**		.05	.01	4.33*	5.14*

Note. Multivariate tests compare the two groups (e.g., managers vs support personnel) on all four factors simultaneously, using Pillai's V as calculated by SPSSI MANOVA.

*p < .05
**p < .01